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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
DIVISION OF AGRICULTURAL ENGINEERING

S. H. McCrory, Chief

MONTHLY NEWS LETTER

WASHINGTON, D. C., MAY 20, 1925.

IN ORDER THAT THE MEMBERS OF THE DIVISION MAY BE KEPT BETTER POSTED AS TO THE ACTIVITIES OF THE DIVISION AS A WHOLE, IT HAS BEEN DECIDED TO ISSUE A MONTHLY NEWS LETTER. THIS LETTER WILL BE MAILED FROM THE WASHINGTON OFFICE ABOUT THE 20TH OF EACH MONTH AND MATERIAL FOR IT SHOULD BE IN BY THE 15TH OF THE MONTH. TO MAKE THIS LETTER HELPFUL AND INFORMATIVE, IT IS NECESSARY TO HAVE THE COOPERATION OF ALL THE FIELD MEN. THE FOLLOWING FEATURES WILL BE INCLUDED IN THE LETTER:

NEW PROJECTS AUTHORIZED DURING THE MONTH.  
REPORTS RECEIVED DURING THE MONTH, ALSO REPORTS OFFICIALLY TRANSMITTED WITH A BRIEF RESUME OF IMPORTANT FEATURES.  
INFORMATION IN REGARD TO MOVEMENT OF MEMBERS ON ITINERARY.  
STATEMENTS REGARDING CONFERENCES OR MEETINGS ATTENDED AND BRIEF STATEMENT OF RESULTS ACCOMPLISHED.  
INFORMATION IN REGARD TO OFFICE POLICIES, ACCOUNTS, ETC.  
MENTION OF NEW BOOKS OR ARTICLES OF PARTICULAR INTEREST TO MEMBERS.  
BRIEF PERSONAL ITEMS.

THIS FIRST LETTER CONTAINS A BRIEF DESCRIPTION OF THE ACTIVE PROJECTS AND A RESUME OF THEIR PRESENT STATUS. HEREAFTER THE LETTER WILL BE LIMITED TO FOUR PAGES, SINGLE-SPACED.

DRAINAGE.

RUN-OFF INVESTIGATIONS:

THE ULTIMATE OBJECT OF THIS INVESTIGATION IS TO DETERMINE THE NECESSARY CAPACITIES OF OPEN DITCHES AND TILE DRAINS. THE INVESTIGATION INCLUDES RECORDS OF PRECIPITATION, THE RATES OF FLOW IN DRAINAGE CHANNELS, THE PERCENTAGE OF PRECIPITATION THAT APPEARS AS RUN-OFF, AND OTHER RELATED DATA. CURRENT METER RATINGS OF OPEN DRAINAGE CHANNELS ARE MADE AT VARIOUS STAGES AND CONTINUOUS RECORDS OF THE DEPTH OF WATER ARE SECURED WITH AUTOMATIC RECORDING INSTRUMENTS. DETAILED INFORMATION IS SECURED REGARDING THE SIZE, TOPOGRAPHY, SOILS, ETC. OF THE DRAINAGE AREAS.

C. E. RAMSER, CAPE GIRARDEAU, MO. IS IN GENERAL CHARGE OF RUN-OFF INVESTIGATIONS IN THE MIDDLE WEST. HE IS ALSO MEASURING RUN-OFF IN SALS, GANEY AND RAMSEY CREEKS, HILL STREAMS IN SOUTHEAST MISSOURI WITH WATERSHEDS RANGING FROM 10 TO 35 SQUARE MILES IN SIZE, FOR USE IN FLOOD CONTROL PROBLEMS. MEASUREMENTS ARE ALSO BEING MADE OF RUN-OFF IN DITCH NO. 1 OF LITTLE RIVER DRAINAGE DISTRICT AND OF HILLEMANN SPRING BRANCH DITCH, THE LATTER HAVING A WATERSHED AREA OF 150 ACRES. MEASUREMENTS ARE ALSO BEING MADE IN THE MAIN DIVERSION CHANNEL AND FLOODWAY OF LITTLE RIVER DRAINAGE DISTRICT WHICH DRAINS ABOUT 1200 SQUARE MILES OF HILLY WATERSHED. MEASUREMENTS TO DETERMINE THE VALUE OF  $n$  FOR CONDITIONS WITH AND WITHOUT GROWTH OF WILLOWS IN DITCHES AND FOR CLEARED AND UNCLEARED CONDITIONS IN THE MAIN FLOODWAY ARE BEING MADE. THE BEST METHOD FOR COMPUTING COMBINED FLOW IN CHANNEL AND FLOODWAY AND THE RATE OF CREST TRAVEL IN FLOODWAYS ARE ALSO BEING INVESTIGATED. A PROGRESS REPORT COVERING PART OF THESE INVESTIGATIONS HAS BEEN PREPARED. THERE HAS BEEN NO OPPORTUNITY AS YET TO MEASURE A HIGH RATE OF RUN-OFF IN THE MAIN FLOODWAY.

ROBERT A. NORTON IS INVESTIGATING RUN-OFF NEAR URBANA, ILLINOIS, IN COOPERATION WITH THE UNIVERSITY OF ILLINOIS. FOR NEARLY TWO MONTHS THERE HAS BEEN NO RAIN EXCEPT OCCASIONAL SHOWERS. PRIOR TO THAT, FROM MARCH 13 TO 18, BETWEEN 3 AND 4 INCHES OF RAIN FELL AND SEVERAL OF THE HIGHEST STAGES EVER REACHED IN THE DITCHES WERE GAGED AND SLOPE MEASUREMENTS TAKEN. TWELVE GAGING STATIONS ARE MAINTAINED.

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EIGHT GAGING STATIONS ARE MAINTAINED IN CENTRAL MISSISSIPPI BY B. S. CLAYTON ON WATERSHEDS OF FROM 12.6 TO 463 SQUARE MILES. AT 4 OF THESE, AUTOMATIC REGISTERING DEVICES ARE USED TO RECORD STREAM STAGES. FOOT BRIDGES FOR GAGING PURPOSES ARE USED AT TWO STATIONS AND WAGON BRIDGES AT THE OTHERS. RAINFALL RECORDS ARE BEING KEPT AT 6 POINTS. THE RESULTS SECURED BY TILING LAND ARE GENERALLY CONSIDERED UNSATISFACTORY BY LAND-OWNERS AND SOME INVESTIGATIONS ARE BEING MADE OF TILE SYSTEMS TO DETERMINE THE REASON FOR THE UNFAVORABLE RESULTS. THUS FAR THE SEASON HAS NOT BEEN FAVORABLE FOR SECURING RUN-OFF DATA OWING TO LIGHT RAINFALL.

P. T. SIMONS IS MEASURING RUN-OFF AND RAINFALL AND INVESTIGATING OPERATIONS OF 3 PRINCIPAL OUTLET CHANNELS IN CYPRESS CREEK DRAINAGE DISTRICT, SOUTHEASTERN ARKANSAS. EIGHT STREAM GAGES AND 6 RAIN GAGES ARE MAINTAINED AND SLOPE MEASUREMENTS ARE BEING MADE AT 5 STATIONS. A MAP IS BEING PREPARED TO SHOW THE WATERSHED AND AMOUNT OF CLEARED LAND AND LATERAL DRAINS IN THE DISTRICT.

GUY A. HART, FAYETTE, ALABAMA, IS MEASURING RUN-OFF AND RAINFALL ON THE FAYETTE AND LAMAR COUNTY DRAINAGE DISTRICT IN ALABAMA. MR. HART WHO IS AT PRESENT WORKING FOR THE ALABAMA STATE HIGHWAY COMMISSION IS LOOKING AFTER THE RUNOFF WORK ON A PER DIEM BASIS.

F. O. BARTEL IS PREPARING TO COMPILE DAILY RECORDS OF THE RUN-OFF IN THIRD CREEK, IREDELL COUNTY, N.C. MADE FROM MARCH, 1913 TO SEPTEMBER, 1923. IT IS NOT LIKELY THIS WORK CAN BE UNDERTAKEN BEFORE JULY.

#### PUMPING FOR DRAINAGE.

THIS INCLUDES THE INVESTIGATION OF PROBLEMS RELATING TO DRAINAGE WHERE PART OR ALL OF THE WATER MUST BE REMOVED BY PUMPING, SUCH AS COMPARISONS OF THE VARIOUS KINDS OF PUMPS, ENGINES AND MOTORES; THE BEST ARRANGEMENT OF EQUIPMENT; THE EFFICIENCY AND OPERATING COSTS. EXAMINATIONS ARE MADE OF DRAINAGE DISTRICTS THAT HAVE INSTALLED PUMPING PLANTS AND INFORMATION SECURED BY OBSERVATION, BY TESTS, AND MEASUREMENTS AND FROM THE RECORDS OF THE DISTRICTS.

F. F. SHAFER, QUINCY, ILLINOIS, IS KEEPING DAILY RECORDS OF 11 DRAINAGE PUMPING PLANTS IN THE UPPER MISSISSIPPI VALLEY. DUE TO LIGHT RAINFALL AND LOW STAGES ON THE RIVER, 3 PLANTS HAVE NOT OPERATED YET THIS YEAR. DURING APRIL OVERALL TESTS WERE MADE ON SOME OF THE PLANTS, PROF. W. B. GREGORY AND L. A. JONES COOPERATING. THE PLANTS ARE VISITED ONCE A MONTH AND PITOT TUBE OR CURRENT METER MEASUREMENTS OF THE DISCHARGE MADE. THE RUNNING EXPENSES ARE ALSO CHECKED UP MONTHLY. IT IS EXPECTED THAT THIS INVESTIGATION WILL CONTINUE FOR 2 OR 3 YEARS.

#### FLOW OF WATER IN DRAINAGE CONDUITS AND THROUGH CULVERTS.

D. L. YARNELL, IOWA CITY, IOWA, HAS COMPLETED THE EXPERIMENTS ON FLOW THROUGH PIPE AND BOX CULVERTS CARRIED ON FOR SOME TIME PAST WITH THE UNIVERSITY OF IOWA AND A REPORT OF THE RESULTS IS TO BE PRINTED BY THE UNIVERSITY OF IOWA. PRELIMINARY STUDIES ARE NOW BEING MADE ON THE TYPE OF LABORATORY APPARATUS BEST SUITED TO STUDY THE FLOW OF WATER AROUND BENDS. A CLOSED CHANNEL 10 INCHES SQUARE, WITH ENTRANCE AND OUTLET CHANNELS EACH 25 FEET LONG, CONNECTED BY A 180° BEND IS CONTEMPLATED. THE POSSIBILITIES OF USING PLATE GLASS CONDUITS FOR THIS WORK ARE BEING STUDIED.

TESTS ARE NOW BEING CONDUCTED BY MR. YARNELL ON VARIOUS MAKES OF CURRENT METERS TO DETERMINE THE EFFECT OF EDDIES ON METERS. THE TESTS AND REPORT WILL BE COMPLETED IN JUNE.

#### DEPTH AND SPACING OF FARM DRAINS.

THIS CONSISTS IN GENERAL OF A STUDY OF THE DEPTH AND MOVEMENT OF GROUND WATER AND ITS EFFECT ON THE DEPTH AND SPACING OF DRAINS. SERIES OF OBSERVATION WELLS ARE INSTALLED BY WHICH THE FLUCTUATIONS OF THE GROUND WATER MAY BE OBSERVED. RAINFALL RECORDS ARE ALSO KEPT, AND THE CHARACTER OF THE SOIL IS CAREFULLY OBSERVED.

F. O. BARTEL IS CONDUCTING INVESTIGATIONS ON MUCK SOILS AT WENONA, WASHINGTON COUNTY, NORTH CAROLINA, TERRA CEIA, BEAUFORT COUNTY AND ON FINE SANDY LOAM AT WILLARD, PENDER COUNTY, N.C., ON TILE DRAINED LAND AND ON LAND DRAINED BY SHALLOW OPEN DITCHES. A REPORT OF THESE INVESTIGATIONS WILL PROBABLY BE SUBMITTED IN THE NEAR FUTURE. THE RECORDS AT TERRA CEIA COVER A PERIOD OF 16 MONTHS, THOSE AT WILLARD 24 MONTHS AND THOSE AT WENONA 34 MONTHS.



Eight gaging stations are maintained in Central Mississippi by U. S. Cavalry or Watershed by from 15.5 to 45.5 square miles. At 5 of these, automatic recording devices are used to record stream stages. Four are used for gaging purposes and used at two stations and reason bridges at the others. Rainfall records are being kept at 5 points. The results secured by tilting land are generally considered satisfactory by land owners and some investigations are being made of tile systems to determine the reason for the unfavorable results. This far the season has not been favorable for securing runoff data owing to light rainfall.

F. J. Simon is measuring runoff and rainfall and investigating operation of 3 principal outlet channels in Cypress Creek Drainage District, Southeastern Arkansas. Eight stream gages and 5 rain gages are maintained and stage measurements are being made at 5 stations. A map is being prepared to show the watershed and amount of cleared land and lateral drains in the district.

Gov. A. Hart, Fayette, Alabama, is measuring runoff and rainfall on the Fayette and Lamar County Drainage District in Alabama. Mr. Hart who is at present working for the Alabama State Highway Commission is looking after the runoff work on a per diem basis.

F. O. Bartel is preparing to compile daily records of the runoff in Three Creek, Jackson County, N. C. made from March, 1913 to September, 1923. It is not likely this work can be completed before July.

#### Planning for Drainage

This includes the investigation of problems relating to drainage where part or all of the water must be removed by pumping, such as low-lying areas of the various kinds of farms, engines and motors; the cost of equipment; the efficiency and operating costs. Examination and made of drainage districts that have installed pumping plants and information secured by observation, by tests, and measurements and from the records of the districts.

F. F. Warner, Quincy, Illinois, is keeping daily records of drainage pumping plants in the Upper Mississippi Valley. The 15 light rainfall and low stages on the river, 3 plants have not operated yet this year. During April overall tests were made on some of the plants. Mr. W. B. Gregory and L. A. Jones cooperated. The plants are visited once a month and pitot tube or current meter measurements of the discharge made. The running expenses are also checked on monthly. It is expected that this investigation will continue for 2 or 3 years.

#### Flow of Water in Drainage Conduits and Through Culverts

D. A. Farnell, Iowa City, Iowa, has completed the experiments on flow through pipe and box culverts carried on for some time past with the University of Iowa and a report of the results is to be printed by the University of Iowa. Preliminary studies are now being made on the type of culvert materials best suited to study the flow of water through culverts. A culvert 10 inches square, with entrance and outlet channels each 35 feet long, connected by a 180° bend is contemplated. The possibilities of using plate glass conduits for this work are being studied.

Tests are now being conducted at the University of Iowa on various types of culverts to determine the effect of shape on material. The tests and report will be completed in June.

#### Depth and Spacing of Farm Drains

This consists in general of a study of the depth and movement of ground water and its effect on the depth and spacing of drains. Series of observation wells are installed by which the fluctuations of the ground water may be observed. Rainfall records are also kept, and the character of the soil is carefully observed.

F. O. Bartel is conducting investigations on rock wells at Winston-Salem, North Carolina, and on the Sandy Loan at Willard, Bender County, N. C., on the drained land and on land drained by shallow open ditches. A report of these investigations will probably be submitted in the near future. The records at Terra Ceia cover a period of 15 months, those at Willard 24 months and those at Winston 24 months.



#### CONTROL OF SOIL EROSION.

THIS PROJECT WAS INSTITUTED A NUMBER OF YEARS AGO AND SEVERAL BULLETINS HAVE BEEN PUBLISHED ALONG THIS LINE. FIELD WORK IN SOIL EROSION IS BEING CONDUCTED BY F. O. BARTEL IN COOPERATION WITH THE NORTH CAROLINA EXPERIMENT STATION AT RALEIGH, N.C. A NUMBER OF PLOTS VARYING IN LENGTH FROM 37-1/2 TO 200 FEET ARE PLANTED TO DIFFERENT CROPS AND FACILITIES ARE PROVIDED FOR COLLECTING AND MEASURING ACCURATELY THE SOIL WHICH IS ERODED FROM EACH. CAREFUL DAILY RAINFALL RECORDS ARE KEPT. A PROGRESS REPORT ON THIS PROJECT WILL BE PREPARED IN THE NEAR FUTURE.

#### USE OF TILE FOR LARGE OUTLET DRAINS.

THIS IS A NEW PROJECT ABOUT TO BE UNDERTAKEN BY R. D. MARSDEN OF THE WASHINGTON OFFICE. THE COST OF LARGE TILE DRAINS, WHEN USED FOR CONSTRUCTION, MAINTENANCE, REPAIR, AND RECONSTRUCTION, WILL BE ANALYZED TO DETERMINE WHEREIN SAVINGS MIGHT HAVE BEEN MADE IN THE ULTIMATE COST OF DRAINAGE BY MORE CARE IN DESIGN AND CONSTRUCTION OR BY USING OPEN DITCHES, AND WHAT IS THE MAXIMUM ECONOMICAL SIZE OF TILE UNDER CONDITIONS ORDINARILY FOUND IN THE NORTH CENTRAL STATES.

#### EFFECT OF SOIL ALKALIES AND ACIDS UPON CONCRETE TILE.

THESE STUDIES HAVE FOR THEIR ULTIMATE OBJECT THE IMPROVEMENT OF THE QUALITY OF FARM DRAIN TILE, ESPECIALLY TO DEVELOP CONCRETE TILE THAT WILL BE DURABLE IN SO-CALLED "ALKALI" SOILS AND SOME OF THE PEAT SOILS. THE EFFECT OF FROST ACTION ON CLAY TILE IS ALSO BEING OBSERVED. AN EXPERIMENTAL LABORATORY IS LOCATED AT UNIVERSITY FARM, ST. PAUL, MINN. AND IS IN CHARGE OF D. G. MILLER, ASSISTED BY PAUL C. MCGREW. THE WORK IS IN COOPERATION WITH THE DEPARTMENT OF DRAINAGE AND WATERS, STATE OF MINN. AND THE DEPT. OF AGRI. OF THE UNIV. OF MINN. UP TO THE PRESENT NEARLY 20,000 EXPERIMENTAL CYLINDERS AND DRAIN TILE HAVE BEEN MADE, MANY OF WHICH HAVE BEEN INSTALLED FOR OBSERVATION UNDER VARIOUS FIELD CONDITIONS IN MINNESOTA, WISCONSIN AND THE DAKOTAS. A SHORT REPORT WILL PROBABLY BE PREPARED SOON COVERING THE MOST OUTSTANDING FEATURES AND FINDINGS TO DATE. A LIMITED NUMBER OF THE FOLLOWING TWO PAPERS ARE AVAILABLE TO INTERESTED ENGINEERS, NAMELY: REPRINT FROM 1924 A.S.T.M. PROCEEDINGS ENTITLED "LABORATORY INVESTIGATIONS OF THE INFLUENCE OF CURING CONDITIONS AND VARIOUS ADMIXTURES ON THE LIFE OF CONCRETE", ETC. AND REPRINT FROM CONCRETE, JUNE, 1924, ENTITLED "CURING CONDITIONS OF CONCRETE DRAIN TILE, A FACTOR OF RESISTANCE TO SULPHATE WATERS".

#### IRRIGATION IN THE HUMID REGIONS.

THIS INCLUDES STUDIES OF THE PRACTICABILITY OF IRRIGATION IN THE REGIONS WHERE THE RAINFALL IS NORMALLY SUFFICIENT FOR GROWING ORDINARY FIELD CROPS.

EXPERIMENTS ARE IN PROGRESS TO DETERMINE THE EFFECT OF IRRIGATION ON SUGAR CANE NEAR FRANKLIN, LA. THE WORK IS IN CHARGE OF F. F. STAEBNER, WASHINGTON OFFICE, ASSISTED BY JOHN G. SUTTON, FRANKLIN, LOUISIANA. THIS YEAR ONE EXPERIMENT CONSISTS IN TRYING DIFFERENT METHODS AND TIMES OF APPLICATION ON 8 PLOTS OF FALL PLANTED CANE, 2 OF WHICH ARE CHECK PLOTS. THE OTHER EXPERIMENT IS FOR THE PURPOSE OF DETERMINING WHETHER OR NOT THE INCREASED YIELD OF IRRIGATED OVER NON-IRRIGATED CANE WILL JUSTIFY THE ADDED COST. CAREFUL COST RECORDS ARE KEPT AND THE YIELD OF IRRIGATED AND NON-IRRIGATED CANE WILL BE COMPARED.

A. O. KAY WITH HEADQUARTERS AT COCOA, FLA. HAS ABOUT COMPLETED SOIL MOISTURE INVESTIGATIONS IN CITRUS GROVES IN BREVARD COUNTY, FOR THE PURPOSE OF ASCERTAINING THE RELATION OF MOISTURE CONDITION TO THE DISEASED CONDITION OF THE TREES.

MR. KAY IS ALSO INVESTIGATING THE POSSIBILITIES OF SEWAGE IRRIGATION AT GAINSVILLE, FLA. IN COOPERATION WITH THE FLORIDA EXPERIMENT STATION.

#### GROUND WATER INVESTIGATIONS IN FLORIDA.

A NEW INVESTIGATION HAS RECENTLY BEEN UNDERTAKEN TO DETERMINE THE EFFECT OF UNDERDRAINAGE UPON THE SHEDDING OF THE SQUARES AND LEAVES OF COTTON PLANTS. THE YIELD OF COTTON ON LARGE AREAS IS DECREASING DUE TO THIS SHEDDING AND IT IS BELIEVED THAT SOIL MOISTURE CONDITIONS ARE LARGELY RESPONSIBLE FOR IT. THIS IS ALSO A COOPERATIVE PROJECT AND IS IN CHARGE OF A. O. KAY. THE STUDY INCLUDES SOIL MOISTURE DETERMINATIONS, RECORDS OF THE FLUCTUATION OF GROUND WATER TABLE AND THE EFFECT OF DRAINAGE ON COTTON PLANTS.

AT THE REQUEST OF THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS R. D. MARSDEN HAS BEGUN THE PREPARATION OF A COMPENDIUM OF RESEARCH PROBLEMS IN AGRICULTURAL ENGINEERING. HE WILL HAVE THE COLLABORATION OF OTHER



### CONTROL OF SOIL EROSION

This project was instituted a number of years ago and several experiments have been conducted along this line. Field work in soil erosion is being conducted by F. O. Bartel in cooperation with the North Carolina Experiment Station at Raleigh, N.C. A number of plots varying in length from 37-1/2 to 500 feet are planted to different crops and facilities are provided for collecting and measuring accurately the soil which is eroded from each. Careful daily rainfall records are kept. A progress report on this project will be prepared in the near future.

### USE OF TILE FOR LARGE OUTLET DRAINAGE

This is a new project about to be undertaken by R. D. Hanson of the Washington office. The cost of large tile drainage, when used for construction, maintenance, repair, and reconstruction, will be analyzed to determine wherein savings might have been made in the ultimate cost of drainage by more care in design and construction or by using open ditches, and what is the maximum economical size of tile under conditions ordinarily found in the North Central States.

### EFFECT OF SOIL ALKALIES AND ACIDS UPON CONCRETE TILE

These studies have for their ultimate object the improvement of the quality of farm drain tile, especially to develop concrete tile that will be durable in so-called "alkali" soils and some of the peat soils. The effect of frost action on clay tile is also being observed. An experimental station is located at University Farm, St. Paul, Minn., and is in charge of G. Miller, assisted by Paul C. McGowan. The work is in cooperation with the Department of Drainage and Waters, State of Minn., and the Dept. of Agric. of the Univ. of Minn. Up to the present nearly 50,000 experimental cylinders and drain tile have been made, many of which have been installed for observation under various field conditions in Minnesota, Wisconsin and the Dakotas. A short report will probably be prepared soon covering the most outstanding features and findings to date. A limited number of the following two papers are available to interested engineers, namely: Report from 1924 A.S.T.M. Proceedings entitled "Laboratory Investigations of the Influence of Various Conditions and Various Alkalies on the Life of Concrete", etc., and Report from Concrete, June, 1924, entitled "During Conditions of Concrete Drain Tile, a Factor of Resistance to Sulfate Waters".

### IRRIGATION IN THE MISSISSIPPI REGION

This includes studies of the practicability of irrigation in the regions where the rainfall is normally sufficient for growing ordinary field crops.

Experiments are in progress to determine the effect of irrigation on sugar cane near Franklin, La. The work is in charge of F. F. Stachura, Washington office, assisted by John G. Button, Franklin, Louisiana. This year the experiment consists in trying different methods and times of application in 8 plots of fall planted cane, 5 of which are check plots. The other experiment is for the purpose of determining whether or not the increased yield of irrigated over non-irrigated cane will justify the added cost. Careful cost records are kept and the yield of irrigated and non-irrigated cane will be compared.

A. O. Kay with headquarters at Ocala, Fla., has about completed soil moisture investigations in citrus groves in Orange County, for the purpose of ascertaining the relation of moisture condition to the bearing condition of the trees.

Mr. Kay is also investigating the possibilities of sewage irrigation at Gainesville, Fla. in cooperation with the Florida Experiment Station.

### GROUND WATER INVESTIGATIONS IN FLORIDA

A new investigation has recently been undertaken to determine the effect of underground water upon the shedding of the squares and leaves of cotton plants. The yield of cotton on large areas is decreasing due to this shedding and it is believed that soil moisture conditions are largely responsible for it. This is also a cooperative project and is in charge of A. O. Kay. The study includes soil moisture determinations, records of the fluctuation of ground water table and the effect of drainage on cotton plants.

At the request of the American Society of Agricultural Engineers R. D. Hanson has begun the preparation of a compendium of research work done in agricultural engineering. He will have the collaboration of other



ENGINEERS OF THE DIVISION, THE OFFICE OF EXPERIMENT STATIONS, AND THE STATE COLLEGES AND STATIONS. THIS IS PART OF A COMPREHENSIVE REPORT UPON THE FIELD OF AGRICULTURAL ENGINEERING RESEARCH.

#### LAND RECLAMATION AND SETTLEMENT.

AS PART OF AN INTER-BUREAU REPORT UPON THE LAND UTILIZATION PROBLEMS OF THE PINEY WOODS REGION, MR. MARSDEN IS STUDYING THE AMOUNT, LOCATION, AND CONDITION OF THE SWAMP AND OVERFLOWED LAND FROM THE NORTH BOUNDARY OF NORTH CAROLINA TO THE MISSISSIPPI RIVER, AND THE PRACTICABILITY OF RECLAIMING IT. A TENTATIVE ESTIMATE OF THE AREA NOT RECLAIMABLE HAS BEEN MADE BY COUNTIES, INCLUDING A LARGE NUMBER OF INTERPOLATIONS. ESTIMATES OF THE AREAS UNFIT FOR CULTIVATION AND NEEDING COMMUNITY DRAINAGE WERE MADE IN 1922 BY L. A. JONES OF THIS DIVISION AND F. J. MARSCHNER OF THE BUREAU OF AGRICULTURAL ECONOMICS. INFORMATION AS TO PROGRESS IN DEVELOPMENT AND COSTS OF DRAINAGE AND CLEARING IN A CONSIDERABLE NUMBER OF DRAINAGE DISTRICTS IN FLORIDA AND THE CAROLINAS, WAS SECURED BY P. T. SIMONS OF THIS DIVISION IN NOVEMBER AND DECEMBER, 1924. CONTINUATION OF WORK ON THIS PROJECT HAS BEEN DEFERRED PENDING THE PREPARATION OF NECESSARY DATA BY OTHER BUREAUS OF THE DEPARTMENT.

NOTES: JOSEPH A. WISE, WHO FORMERLY ASSISTED IN DRAIN TILE WORK HAS ACCEPTED AN APPOINTMENT IN THE CORPS OF CIVIL ENGINEERS, U. S. NAVY, WASHINGTON, D.C. WITH RANK OF LIEUTENANT, JR. GRADE.

THE UNIV. OF IOWA, THROUGH THREE OF ITS GRADUATE ENGINEERING STUDENTS HAS CONDUCTED SOME INTERESTING HYDRAULIC RESEARCH WORK, INCLUDING THE DETERMINATION OF THE VALUE OF  $n$  IN KUTTER'S FORMULA FOR THE IOWA RIVER, THE EFFECT OF "ROUGHENING" THE WEIR PLATE AND WEIR BULKHEAD, AND THE EFFECT OF OBSTRUCTIONS ON THE FLOW OF WATER IN CHANNELS.

### IRRIGATION

DR. SAMUEL FORTIER RETIRED FROM THE POSITION OF ASSOCIATE CHIEF OF THE DIVISION ON APRIL 25 AND WILL IN FUTURE DEVOTE HIS TIME TO THE PREPARATION OF BULLETINS AND MAJOR CONSULTING WORK. ON THE SAME DATE WALTER W. McLAUGHLIN WAS APPOINTED ACTING ASSOCIATE CHIEF OF THE DIVISION, THUS SUCCEEDING DR. FORTIER IN DIRECTING THE ADMINISTRATIVE WORK OF THE IRRIGATION SUBDIVISION.

#### UTILIZATION OF WATER IN IRRIGATION.

A STUDY OF THE IRRIGATION OF COTTON HAS BEEN OUTLINED AND THE FIELD WORK WAS ACTUALLY STARTED BY SEVERAL MEMBERS OF THE FORCE, INCLUDING R. G. HEMPHILL, J. C. MARR, D. W. BLOODGOOD AND HARRY F. BLANEY. SOME TIME WAS SPENT IN APRIL SECURING DATA ON THIS CROP IN NEW MEXICO AND LATER MR. MARR VISITED OTHER POINTS IN THE SOUTHWEST ON THE SAME PROJECT, BEING ASSISTED BY MR. BLANEY IN SOUTHERN CALIFORNIA.

THE FIRST BULLETIN OF A SERIES OF 5 BULLETINS BY DR. SAMUEL FORTIER ON THE WATER REQUIREMENTS OF ARABLE LANDS IS NOW IN PRESS, NAMELY, "WATER REQUIREMENTS OF THE ARABLE LANDS OF THE GREAT BASIN". WORK IS NOW IN PROGRESS ON THE SECOND OF THE SERIES DEALING WITH THE MISSOURI RIVER BASIN.

FIELD WORK IS IN PROGRESS IN COOPERATION WITH THE DEPARTMENT OF PUBLIC WORKS OF CALIFORNIA AND THE UNIVERSITY OF CALIFORNIA, ON DUTY OF WATER IN THE INTERIOR VALLEY OF CALIFORNIA.

D. W. BLOODGOOD HAS COMPLETED A MANUSCRIPT ENTITLED "NET REQUIREMENTS OF CROPS FOR IRRIGATION WATER IN THE MESILLA VALLEY, N.M."

R. L. PARSHALL, ASSISTED BY W. L. STOCKWELL, JR. AND C. S. TAYLOR, HAS DONE MUCH WORK ON EVAPORATION FROM A FREE WATER SURFACE AT THE LABORATORY AT FT. COLLINS, COLO. THE WORK BEING IN COOPERATION WITH THE COLORADO AGRICULTURAL EXPERIMENT STATION. AN ADDITIONAL EVAPORATION PROJECT HAS BEEN UNDERTAKEN AT EAST PARK RESERVOIR AT STONYFORD, CALIFORNIA, IN COOPERATION WITH THE AM. SOC. OF C.E. AND THE BUREAU OF RECLAMATION. GAGES HAVE BEEN SET ON THE RESERVOIR AND THE WORK DURING THE SEASON WILL BE DIRECTED TOWARD PROVING OR DISPROVING THE SLEIGHT THEORY OF EVAPORATION AS APPLIED TO A LARGE WATER SURFACE APPROACHING INFINITY.

WORK IS STILL IN PROGRESS ON A PROJECT TO DETERMINE THE MOST PRACTICAL AND ECONOMICAL MEANS OF UTILIZING GROUND WATER IN IRRIGATION, UNDER THE DIRECTION OF F. L. BIXBY, UNIVERSITY OF NEVADA, RENO.

#### APPLIANCES AND EQUIPMENT FOR IRRIGATION.

AS A RESULT OF SEVERAL YEARS' FIELD WORK ON DROPS AND CHUTES, A. T. MITCHELSON OF THE BERKELEY OFFICE IS PREPARING A MANUSCRIPT FOR A BULLETIN ON THIS SUBJECT.



ENGINEERS OF THE DIVISION, THE OFFICE OF EXPERIMENT STATIONS, AND THE STATE COLLEGE AND STATIONS. THIS IS PART OF A COMPREHENSIVE REPORT UPON THE FIELD OF AGRICULTURAL ENGINEERING RESEARCH.

#### LAND RECLAMATION AND SETTLEMENT

AS PART OF AN INTER-BUREAU REPORT UPON THE LAND UTILIZATION PROBLEMS OF THE PINKEY HILLS REGION, Mr. MARSHALL IS STUDYING THE AMOUNT, LOCATION, AND CONDITION OF THE SWAMP AND OVERGROWN LAND FROM THE NORTH BOUNDARY OF NORTH CAROLINA TO THE MISSISSIPPI RIVER, AND THE PRACTICABILITY OF RECLAIMING IT. A TENTATIVE ESTIMATE OF THE AREA NOT RECLAIMABLE HAS BEEN MADE BY COUNTIES, INCLUDING A LARGE NUMBER OF INTERPOLATIONS. ESTIMATE OF THE AREA UNIT FOR CULTIVATION AND RECLAMATION COMMUNITY DRAINAGE WERE MADE IN 1935 BY L. A. JONES OF THIS DIVISION AND F. J. MARSHALL OF THE BUREAU OF AGRICULTURAL ECONOMICS. INFORMATION AS TO PROGRESS IN DEVELOPMENT AND COSTS OF DRAINAGE AND CLEARING IN A CONSIDERABLE NUMBER OF DRAINAGE DISTRICTS IN FLORIDA AND THE CAROLINAS, WAS SECURED BY P. T. SIMONS OF THIS DIVISION IN NOVEMBER AND DECEMBER, 1934. CONTINUATION OF WORK ON THIS PROJECT HAS BEEN DEFERRED, REMAINING THE PREPARATION OF NECESSARY DATA BY OTHER BUREAUS OF THE DEPARTMENT.

NOTE: JOSEPH A. WISE, WHO FORMERLY ASSISTED IN DRAIN TIE WORK HAS ACCEPTED AN APPOINTMENT IN THE CORPS OF CIVIL ENGINEERS, U. S. NAVY, WASHINGTON, D. C. WITH RANK OF LIEUTENANT, JR. GRADE.

THE DIV. OF IOWA, THROUGH THREE OF ITS GRADUATE ENGINEERING STUDENTS HAS CONDUCTED SOME INTERESTING HYDRAULIC RESEARCH WORK, INCLUDING THE DETERMINATION OF THE VALUE OF  $n$  IN KUTTER'S FORMULA FOR THE IOWA RIVER, THE EFFECT OF "ROUGHENING" THE WEIR PLATE AND WEIR BULKHEAD, AND THE EFFECT OF OBSTRUCTIONS ON THE FLOW OF WATER IN CHANNELS.

#### IRRIGATION

DR. SAMUEL FORTNER RETIRED FROM THE POSITION OF ASSOCIATE CHIEF OF THE DIVISION ON APRIL 25 AND WILL IN FUTURE DEVOTE HIS TIME TO THE PREPARATION OF BULLETINS AND MAJOR CONSULTING WORK. ON THE SAME DATE WALTER W. MORGAN, JR. WAS APPOINTED ACTING ASSOCIATE CHIEF OF THE DIVISION, THIS DUTY BEING DR. FORTNER IN DIRECTING THE ADMINISTRATIVE WORK OF THE IRRIGATION DIVISION.

#### UTILIZATION OF WATER IN IRRIGATION

A STUDY OF THE IRRIGATION OF COTTON HAS BEEN OUTLINED AND THE FIELDWORK WAS ACTUALLY STARTED BY SEVERAL MEMBERS OF THE FORCE, INCLUDING R. G. HENRY, HILL, G. D. MARR, D. W. BLODGETT AND HARRY F. BLANEY. SOME TIME WAS SPENT IN APRIL OBTAINING DATA ON THIS CROP IN NEW MEXICO AND LATER MR. MARR VISITED OTHER POINTS IN THE SOUTHWEST ON THE SAME PROJECT, BEING ASSISTED BY MR. BLANEY IN SOUTHERN CALIFORNIA.

THE FIRST BULLETIN OF A SERIES OF 5 BULLETINS BY DR. SAMUEL FORTNER ON THE WATER REQUIREMENTS OF ARABLE LANDS IS NOW IN PRESS, NAMELY, "WATER FOR CULTIVATORS OF THE ARABLE LANDS OF THE GREAT BASIN". WORK IS NOW IN PROGRESS ON THE SECOND OF THE SERIES DEALING WITH THE MISSOURI RIVER BASIN.

FIELD WORK IS IN PROGRESS IN COOPERATION WITH THE DEPARTMENT OF PUBLIC WORKS OF CALIFORNIA AND THE UNIVERSITY OF CALIFORNIA, ON DUTY OF WATER IN THE INTERIOR VALLEY OF CALIFORNIA.

D. W. BLODGETT HAS COMPLETED A MANUSCRIPT ENTITLED "WATER REQUIREMENTS OF CROPS FOR IRRIGATION WATER IN THE MEXICAL VALLEY, N.M."

R. L. PARSONS, ASSISTED BY W. L. STOCKWELL, JR. AND G. S. TAYLOR, HAS DONE MUCH WORK ON EVAPORATION FROM A FREE WATER SURFACE AT THE LABORATORY AT FT. COLLINS, COLO. THE WORK BEING IN COOPERATION WITH THE COLORADO AGRICULTURAL EXPERIMENT STATION. AN ADDITIONAL EVAPORATION PROJECT HAS BEEN UNDERTAKEN AT EAST PARK RESERVOIR, AT STONEYBROOK, CALIFORNIA, IN COOPERATION WITH THE AM. SOC. OF C.E. AND THE BUREAU OF RECLAMATION. GAGES HAVE BEEN SET ON THE RESERVOIR AND THE WORK DURING THE SEASON WILL BE DIRECTED TOWARD PROVING OR DISPROVING THE SLIGHT THEORY OF EVAPORATION AS APPLIED TO A LARGE WATER SURFACE APPROXIMATING INFINITY.

WORK IS STILL IN PROGRESS ON A PROJECT TO DETERMINE THE MOST PRACTICAL AND ECONOMIC MEANS OF UTILIZING AROUND WATER IN IRRIGATION, UNDER THE DIRECTION OF F. J. BIXBY, UNIVERSITY OF NEVADA, RENO.

#### APPLIANCE AND EQUIPMENT FOR IRRIGATION

AS A RESULT OF SEVERAL YEARS' FIELD WORK ON CROPS AND CHUTES, A. J. MITCHELL OF THE BERKELEY OFFICE IS PREPARING A MANUSCRIPT FOR A BULLETIN ON THIS SUBJECT.



E. J. HOFF, BERKELEY, CALIF., IS WORKING ON THE IMPROVEMENT OF THE HOFF CURRENT METER AND R. L. PARSHALL IS EXPERIMENTING WITH A NEW WATER STAGE REGISTER AT THE FT. COLLINS, COLO. LABORATORY.

FIELD WORK ON THE CONTROL OF SILT IN CHANNELS AND RESERVOIRS IS BEING CONTINUED BY HARRY F. BLANEY IN CALIFORNIA AND R. G. HEMPHILL IN TEXAS. CHAPTER 1 OF THIS SUBJECT HAS BEEN COMPLETED AND IS NOW IN MANUSCRIPT FORM.

A MANUSCRIPT PREPARED AS A RESULT OF A STUDY OF SEEPAGE LOSSES IN CANALS IN CALIFORNIA IS NOW PRACTICALLY COMPLETED.

A. L. FELLOWS IS CONTINUING THE INVESTIGATION OF PERCOLATION THROUGH EARTH DAMS IN COOPERATION WITH THE BUREAU OF RECLAMATION. THIS STUDY IS FOR THE PURPOSE OF SECURING A BETTER UNDERSTANDING OF THE UNDERLYING PRINCIPLES INVOLVED IN THE DESIGN AND CONSTRUCTION OF EARTHEN DAMS AND EMBANKMENTS DESIGNED FOR IMPOUNDING WATER SO AS TO MAKE SUCH STRUCTURES SAFER AND MORE EFFICIENT. OBSERVATION WELLS ARE INSTALLED IN DAMS FOR THE PURPOSE OF OBSERVING THE PLANE OF SATURATION AND THE HYDROSTATIC PRESSURE NEAR THE BASE OF THE DAM.

A STUDY IS BEING CONTINUED IN UTAH BY L. M. WINSOR OF THE BEST AND MOST ECONOMICAL MEANS OF CONSTRUCTING BARRIERS ACROSS FLOOD CHANNELS TO CHECK GRAVEL FLOW AND TO DETERMINE THE SURFACE SLOPE AND NATURE AND EXTENT OF DEBRIS DEPOSITS LAID DOWN ABOVE SUCH BARRIERS DURING HIGH WATER. MOST STREAMS OF THE GREAT BASIN CARRY LARGE QUANTITIES OF SAND AND GRAVEL DURING HIGH WATER, MUCH OF WHICH IS CARRIED INTO IRRIGATION CHANNELS AND ON LAND ADJACENT TO THE MAIN CHANNELS. THIS WORK IS IN COOPERATION WITH THE UTAH AGRICULTURAL EXPERIMENT STATION. A NUMBER OF RETENTION DAMS HAVE BEEN BUILT AT THE EXPENSE OF THE PARTIES INTERESTED.

#### MEASUREMENT OF WATER IN IRRIGATION.

AT THE FT. COLLINS, COLO. LABORATORY AND AT THE BELLEVUE FIELD LABORATORY, COLO., WORK IS CONSTANTLY IN PROGRESS BY R. L. PARSHALL, ASSISTED BY W. L. STOCKWELL, JR. AND C. S. TAYLOR, ON THE TESTING OF MEASURING DEVICES AND THE DESIGN AND IMPROVEMENT OF MEASURING DEVICES. WORK ON THE IMPROVED VENTURI FLUME WHICH WAS DEVELOPED AT THESE LABORATORIES HAS BEEN EXTENDED AND SUCH DEVICES HAVE BEEN INSTALLED UNDER ACTUAL FIELD CONDITIONS IN CANALS HAVING CAPACITIES AS HIGH AS 100 TO 200 SECOND-FEET.

A NEW PROJECT WAS AUTHORIZED DURING APRIL, IN COOPERATION WITH THE CITY OF DENVER, VIZ. A STUDY OF THE FLOW OF WATER IN CERTAIN NEW PIPE LINES AND THE CALIBRATION OF MEASURING DEVICES FOR DIVIDING CERTAIN POOLED WATER RIGHTS ON THE SOUTH PLATTE RIVER AT DENVER, COLO. /

F. C. SCOBEEY HAS IN PREPARATION A BULLETIN DEALING WITH FLOW OF WATER IN CHANNELS BUT IT WILL NOT BE COMPLETED FOR SOME TIME OWING TO THE VOLUMINOUS COMPUTATIONS INVOLVED.

#### CUSTOMS, REGULATIONS AND LAWS RELATING TO IRRIGATION.

THE REORGANIZATION AND CONSOLIDATION OF IRRIGATION ENTERPRISES IN UTAH IS BEING CARRIED ON BY L. M. WINSOR IN COOPERATION WITH THE UTAH AGRICULTURAL EXPERIMENT STATION, SEVERAL IMPORTANT PROGRAMS BEING UNDER WAY AT THIS TIME.

CONSIDERABLE FIELD WORK DEVOTED TOWARD ASCERTAINING THE COST OF FARMING UNDER IRRIGATION HAS BEEN CONDUCTED BY P. A. EWING IN COOPERATION WITH THE BUREAU OF AGRICULTURAL ECONOMICS. MR. EWING IS NOW IN WASHINGTON WORKING WITH R. P. TEELE OF THE BUREAU OF AGRICULTURAL ECONOMICS ON A REPORT OF THE COST OF ESTABLISHING AN IRRIGATED FARM.

A MANUSCRIPT ENTITLED "WATER DELIVERY AS A FEATURE OF IRRIGATION MANAGEMENT" HAS BEEN PREPARED BY WELLS A. HUTCHINS AND SUBMITTED FOR PUBLICATION. MR. HUTCHINS IS NOW ENGAGED IN A STUDY OF THE ORGANIZATION, OPERATION AND ADAPTABILITY OF MUTUAL IRRIGATION COMPANIES IN THE UNITED STATES. MUCH FIELD WORK HAS ALREADY BEEN CARRIED ON AND AFTER SUPPLEMENTING THIS WITH ADDITIONAL FIELD WORK DURING THE COMING SUMMER A BULLETIN WILL BE PREPARED.

BULLETIN NO. 8 OF THE CALIFORNIA DEPARTMENT OF PUBLIC WORKS, ON "COST OF WATER TO IRRIGATORS IN CALIFORNIA" HAS JUST BEEN PUBLISHED AS A RESULT OF COOPERATION BETWEEN THIS BUREAU AND THE STATE.

#### DRAINAGE OF IRRIGATED LANDS.

STUDIES OF THE METHODS OF ACCOMPLISHING THE DRAINAGE OF IRRIGATED LANDS WHICH HAVE BECOME WATER-LOGGED ARE BEING CARRIED ON CONSTANTLY BY R. A. HART, L. T. JESSUP, AND D. W. BLOODGOOD. AT A RECENT CONFERENCE IN THE BERKELEY OFFICE AN OUTLINE FOR FUTURE WORK ALONG THIS LINE WAS DEVELOPED AND A SCHEDULE OF PROCEDURE IS NOW BEING ARRANGED.



THE FIRST OF THESE IS THE FACT THAT THE  
COUNTRY IS A DEVELOPING ONE AND THE  
ECONOMY IS IN A STATE OF TRANSITION.

THE SECOND IS THE FACT THAT THE  
COUNTRY IS A DEVELOPING ONE AND THE  
ECONOMY IS IN A STATE OF TRANSITION.

THE THIRD IS THE FACT THAT THE  
COUNTRY IS A DEVELOPING ONE AND THE  
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THE FOURTH IS THE FACT THAT THE  
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THE FIFTH IS THE FACT THAT THE  
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THE SIXTH IS THE FACT THAT THE  
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THE SEVENTH IS THE FACT THAT THE  
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THE EIGHTH IS THE FACT THAT THE  
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THE NINTH IS THE FACT THAT THE  
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THE TENTH IS THE FACT THAT THE  
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THE ELEVENTH IS THE FACT THAT THE  
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THE TWELFTH IS THE FACT THAT THE  
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THE THIRTEENTH IS THE FACT THAT THE  
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CONSIDERABLE WORK HAS BEEN DONE TOWARD ASCERTAINING THE DRAINAGE RUN-OFF FROM IRRIGATED LANDS, OBSERVATION WELLS HAVING BEEN ESTABLISHED AT VARIOUS POINTS IN OREGON, IDAHO, WYOMING, UTAH AND NEW MEXICO. DURING THE SUMMER ONE MAN'S ENTIRE TIME WILL BE DEVOTED TO THIS STUDY WITH HEADQUARTERS AT SALT LAKE CITY, UTAH.

A MANUSCRIPT FOR A BULLETIN ENTITLED "DRAINAGE BY PUMPING FROM WELLS IN SALT RIVER VALLEY, ARIZ.", BY J. C. MARR, WILL SHORTLY BE SUBMITTED FOR PUBLICATION:

NOTES: A REPORT HAS BEEN RECEIVED FROM A. L. FELLOWS, COVERING THE RESULTS OF HIS VISIT TO NORTH DAKOTA IN NOVEMBER, 1924, AT THE INVITATION OF THE STATE ENGINEER, TO INSPECT VARIOUS IRRIGATION PROJECTS IN THAT STATE. MR. FELLOWS HAS ALSO SUBMITTED AN OUTLINE FOR A STUDY OF THE IRRIGATION NEEDS AND POSSIBILITIES OF THE GREAT PLAINS WHICH, IF APPROVED WILL BE UNDERTAKEN BY THIS BUREAU.

ON APRIL 28 INFORMATION ON THE VALIER, MONTANA, CAREY ACT PROJECT WAS TRANSMITTED TO WASHINGTON, CONSISTING OF DATA ON DUTY OF WATER AND A REPORT ON THE FIELD CAPACITY INVESTIGATIONS ON THE PROJECT.

CARL ROHWER IS STILL INDISPOSED AT HIS HOME IN NEBRASKA.

## RURAL ENGINEERING.

### BUILDING AND EQUIPMENT PLANS.

THIS INCLUDES THE PREPARATION OF BULLETINS RELATING TO AND WORKING DRAWINGS FOR FARM BUILDINGS AND EQUIPMENT. THESE ARE DISTRIBUTED GRATIS TO FARMERS WITH A VIEW TO IMPROVING THE STYLE, ALSO ECONOMIZING IN MATERIALS, ADAPTATION OF STRUCTURES FOR THIS PURPOSE AND SAVING IN LABOR OF OPERATION. A LIST OF DRAWINGS AND BULLETINS RELATING TO FARM STRUCTURES PUBLISHED BY THE AGRICULTURAL EXPERIMENT STATIONS AND COLLEGES AND THIS DIVISION HAS BEEN CLASSIFIED ACCORDING TO SUBJECTS AND IS ISSUED ONLY TO THE HEADS OF THE DEPARTMENTS OF THE STATIONS CONCERNED.

TWO MANUSCRIPTS HAVE BEEN PREPARED FOR PUBLICATION BY M. C. BETTS AND T. A. H. MILLER, ONE ON "MINOR CONCRETE CONSTRUCTION ON THE FARM" AND THE OTHER ON "RAMMED EARTH CONSTRUCTION".

### SANITATION AND WATER SUPPLY.

RECOMMENDATIONS ARE MADE FOR INSTALLING SEWERAGE, WATER SUPPLY AND PLUMBING ON FARMS. A FARMERS' BULLETIN ON "FARMSTEAD WATER SUPPLY" BY G. M. WARREN IS NOW IN PRESS, THIS BULLETIN TO SUPERCEDE FARMERS' BULLETIN 941 ON "WATER SYSTEMS FOR FARM HOMES". MR. WARREN HAS ALSO PREPARED A BULLETIN ON "SIMPLE PLUMBING REPAIRS IN THE HOME", WHICH HAS BEEN SUBMITTED FOR PUBLICATION.

### HEATING AND VENTILATING.

AN INVESTIGATION IS IN PROGRESS ON THE EFFICIENCY OF DOMESTIC OIL BURNERS FOR CENTRAL HEATING SYSTEMS AT A SPECIALLY EQUIPPED LABORATORY ON THE ARLINGTON EXPERIMENT FARM NEAR WASHINGTON, WHERE SEVERAL TYPES OF BOILERS ARE TESTED WITH DIFFERENT TYPES OF OIL BURNERS. THIS WORK HAS BEEN IN CHARGE OF A. M. DANIELS ASSISTED BY A. H. SENNER, W. R. HUMPHRIES, AND E. W. HUNTER.

FOR SEVERAL YEARS INVESTIGATIONS REGARDING THE PROPER VENTILATION OF BARNs IN COLD CLIMATES WERE CONDUCTED AND A FARMERS' BULLETIN ON "PRINCIPLES OF DAIRY BARN VENTILATION", BY M. A. R. KELLEY, HAS BEEN PUBLISHED. WHEN MORE CONCLUSIVE RESULTS ARE OBTAINED IT IS HOPED TO MAKE SPECIFIC RECOMMENDATIONS FOR THE PRACTICAL CONTROL OF BARN VENTILATION.

### DESIGN AND USE OF MECHANICAL EQUIPMENT.

A STUDY IS BEING MADE BY C. D. KINSMAN OF THE EFFECT OF MACHINERY IN THE SAVING OF LABOR. IT IS PROPOSED TO SECURE FROM ALL AVAILABLE SOURCES DATA RELATING TO THE LABOR THAT MAY BE SAVED THROUGH THE USE OF DIFFERENT KINDS AND SIZES OF FARM IMPLEMENTS AND THE APPROXIMATE COST OF USING THESE MACHINES. THE GREATER PART OF THE DATA HAS ALREADY BEEN COLLECTED AND IT IS ONLY NECESSARY TO BRING THE RESULTS UP TO DATE AND PREPARE A REPORT. MR. KINSMAN IS ASSISTED BY L. M. CHURCH IN THIS WORK.

MR. KINSMAN HAS RECENTLY COMPLETED A MANUSCRIPT ON "AN APPRAISAL OF POWER USED ON FARMS IN THE UNITED STATES" WHICH IS NOW IN PRESS.



CONSIDERABLE WORK HAS BEEN DONE TOWARD ESTABLISHING THE CRITICAL  
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VARIOUS POINTS IN OREGON, IDAHO, WYOMING, UTAH AND NEW MEXICO. DURING THE  
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CARL ROHMER IS STILL EMPLOYED AT HIS HOME IN IOWA.

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##### FANILATION AND WATER SUPPLY.

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MR. KINSMAN HAS RECENTLY COMPLETED A MANUSCRIPT ON "AN APPRAISAL  
OF POWER USED ON FARMS IN THE UNITED STATES" WHICH IS NOW IN PRESS.



ELMER JOHNSON HAS BEEN ASSIGNED TO COOPERATE WITH THE BUREAU OF PLANT INDUSTRY AT THE DELTA LABORATORY, TALLULAH, LA. IN DEVELOPING MACHINERY FOR DISTRIBUTING POISON FOR THE CONTROL OF BOLL WEEVIL.

A STUDY HAS BEEN MADE BY C. D. KINSMAN IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA, OF THE USE OF TRACTORS IN CALIFORNIA. QUESTIONNAIRES WERE SENT TO OWNERS OF TRACTORS IN THAT STATE AND THE DATA THUS RECEIVED HAS BEEN ANALYZED AND A MANUSCRIPT FOR A BULLETIN IS NOW IN PREPARATION.

AN INVESTIGATION HAS BEEN UNDERTAKEN IN COOPERATION WITH THE BUREAU OF SOILS, TO DEVELOP A MEANS OF DISTRIBUTING KNOWN AMOUNTS OF FERTILIZER ON FIELDS. A ROOM HAS BEEN EQUIPPED FOR THIS EXPERIMENT WHERE CONSTANT HUMIDITY AND TEMPERATURES CAN BE MAINTAINED. M.A.R. KELLEY REPRESENTS THIS DIVISION IN THE INVESTIGATION.

#### TRANSPORTATION AND STORAGE OF FRUITS AND VEGETABLES.

THESE STUDIES ARE MADE IN COOPERATION WITH THE BUREAU OF PLANT INDUSTRY TO DEVELOP AND PERFECT STRUCTURES FOR PRECOOLING, AND THE PREPARATION OF FRUIT AND VEGETABLES FOR SHIPPING AND STORAGE. STUDIES ARE MADE OF THE VARIOUS KINDS OF FRUITS UNDER DIFFERENT CONDITIONS OF TEMPERATURE, MOISTURE, AND AERATION. METHODS OF PROLONGING THE LIFE OF FRUITS SO THAT THEY CAN BE STORED AND HELD AVAILABLE FOR ANY DESIRED PERIOD WILL BE WORKED OUT WHEREVER POSSIBLE. STUDIES ARE ALSO MADE IN LABORATORY AND IN REFRIGERATOR, VENTILATOR AND HEATER CARS AND ON OCEAN VESSELS TO DETERMINE CONDITIONS REQUIRED FOR THE SAFE TRANSPORTATION OF THE VARIOUS PRODUCTS. S. J. DENNIS IS IN CHARGE OF THE INVESTIGATIONS FOR THIS DIVISION.

#### WORK FOR OTHER BUREAU.

THIS CONSISTS CHIEFLY IN PREPARING DRAWINGS AND EQUIPMENT FOR CONDUCTING WORK IN OTHER BUREAUS. PLANS FOR A COMBINED IMPLEMENT AND STORAGE SHED TO BE BUILT AT NORTH RIDGEVILLE, OHIO, BY THE BUREAU OF PLANT INDUSTRY HAVE JUST BEEN COMPLETED AND PLANS ARE IN PREPARATION FOR A LABORATORY AND SUPERINTENDENT'S COTTAGE TO BE BUILT AT CANAL POINT, FLA., BY THE SAME BUREAU. M. C. BETTS, IS IN CHARGE OF THIS WORK ASSISTED BY T.A.H. MILLER, AND OTHERS IN THE WASHINGTON OFFICE.

### DISTRIBUTION OF SURPLUS WAR EXPLOSIVES

WE HAVE NOW ALMOST COMPLETED THE FIRST YEAR OF THE DISTRIBUTION OF PYROTOL FOR LANDCLEARING PURPOSES. PYROTOL IS THE THIRD OF THESE SURPLUS WAR EXPLOSIVES THAT HAVE BEEN DISTRIBUTED. THE PROJECT OF PYROTOL WILL BE CONTINUED THROUGH AT LEAST ONE MORE YEAR. THAT THESE EXPLOSIVES HAVE BEEN OF GREAT BENEFIT TO THE FARMER IS INDICATED BY THE FOLLOWING FIGURES SHOWING AMOUNTS DISTRIBUTED:

PICRIC ACID	1,710,500
SODATOL	14,119,150
PYROTOL	9,807,100 (UP TO APRIL 30)

MOST OF THE EXPLOSIVES HAVE GONE INTO THE GREAT LANDCLEARING STATES, PARTICULARLY MICHIGAN, WISCONSIN, MINNESOTA, OREGON AND WASHINGTON. IN A NUMBER OF STATES THIS DISTRIBUTION HAS PROMOTED THE CLEARING OF A LARGE ACREAGE OF CULTIVATED LANDS OF STUMPS, AND IN THE NORTHERN STATES OF ENABLING LARGE NUMBERS OF FARMERS OF SO-CALLED CUT-OVER LAND TO ESTABLISH THEMSELVES.



ELMER JOHNSON HAS BEEN ASSIGNED TO COOPERATE WITH THE BUREAU OF PLANT INDUSTRY AT THE DELTA LABORATORY, JACKSON, LA., IN DEVELOPING MACHINERY FOR DISTRIBUTING POISON FOR THE CONTROL OF SOLE BEETLE.

A STUDY HAS BEEN MADE BY G. D. KINGMAN IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA, OF THE USE OF TRACTORS IN CALIFORNIA. QUESTIONS WERE SENT TO OWNERS OF TRACTORS IN THAT STATE AND THE DATA THUS RECEIVED HAS BEEN ANALYZED AND A MANUSCRIPT FOR A BULLETIN IS NOW IN PREPARATION.

AN INVESTIGATION HAS BEEN UNDERTAKEN IN COOPERATION WITH THE BUREAU OF SOILS, TO DEVELOP A MEANS OF DISTRIBUTING KNOWN AMOUNTS OF FERTILIZER ON FIELDS. A ROOM HAS BEEN EQUIPPED FOR THIS EXPERIMENT WHERE CONSTANT HUMIDITY AND TEMPERATURES CAN BE MAINTAINED. W.A.R. KELLY REPRESENTS THIS DIVISION IN THE INVESTIGATION.

#### TRANSPORTATION AND STORAGE OF FRUITS AND VEGETABLES.

THESE STUDIES ARE MADE IN COOPERATION WITH THE BUREAU OF PLANT INDUSTRY TO DEVELOP AND PERFECT STRUCTURES FOR PRECOOLING, AND THE PREPARATION OF FRUIT AND VEGETABLES FOR SHIPPING AND STORAGE. STUDIES ARE MADE OF THE VARIOUS KINDS OF FRUITS UNDER DIFFERENT CONDITIONS OF TEMPERATURE, MOISTURE, AND AERATION. METHODS OF PROLONGING THE LIFE OF FRUITS SO THAT THEY CAN BE STORED AND HELD AVAILABLE FOR ANY DESIRED PERIOD WILL BE WORKED OUT WHEREVER POSSIBLE. STUDIES ARE ALSO MADE IN LABORATORY AND IN REFRIGERATOR, VENTILATOR AND HEATER CARS AND ON OCEAN VESSELS TO DETERMINE CONDITIONS REQUIRED FOR THE SAFE TRANSPORTATION OF THE VARIOUS PRODUCTS. G. J. CONNOR IS IN CHARGE OF THE INVESTIGATION FOR THIS DIVISION.

#### WORK FOR OTHER BUREAUS.

THIS CONSISTS CHIEFLY IN PREPARING DRAWINGS AND EQUIPMENT FOR QUOTING WORK IN OTHER BUREAUS. PLANS FOR A COMBINED IMPLEMENT AND STORAGE SHED TO BE BUILT AT NORTH RIDGEVILLE, OHIO, BY THE BUREAU OF PLANT INDUSTRY HAVE JUST BEEN COMPLETED AND PLANS ARE IN PREPARATION FOR A LABORATORY AND SUPERINTENDENT'S COTTAGE TO BE BUILT AT CANAL POINT, FLA., BY THE SAME BUREAU. M. C. BETTS IS IN CHARGE OF THIS WORK ASSISTED BY T. A. H. MILLER, AND OTHERS IN THE WASHINGTON OFFICE.

#### DISTRIBUTION OF SURPLUS WAR EXPLOSIVES

WE HAVE NOW ALMOST COMPLETED THE FIRST YEAR OF THE DISTRIBUTION OF PYROTOR FOR LANDCLEARING PURPOSES. PYROTOR IS THE THING OF THESE SURPLUS WAR EXPLOSIVES THAT HAVE BEEN DISTRIBUTED. THE PROJECT OF PYROTOR WILL BE CONTINUED THROUGH AT LEAST ONE MORE YEAR. THAT THESE EXPLOSIVES HAVE BEEN OF GREAT BENEFIT TO THE FARMER IS INDICATED BY THE FOLLOWING FIGURES SHOWING AMOUNTS DISTRIBUTED:

Pyrotor	1,877,100 (up to April 30)
Sagator	141,815
Picric acid	170,800

MOST OF THE EXPLOSIVES WERE USED BY THE GREAT LANDCLEARING STATES, PARTICULARLY MICHIGAN, MINNESOTA, WISCONSIN, OREGON AND WYOMING. IN NUMBER OF STATES THIS DISTRIBUTION HAS PROMOTED THE CLEARING OF A LARGE ACRES OF CULTIVATED LANDS BY STUMPS AND IN THE NORTHERN STATES OF CALIFORNIA LARGE NUMBERS OF FARMERS OF SO-CALLED OVER-GRASS LANDS TO ESTABLISH THEMSELVES.